

## Unit 3 Notes: Cognition and Language

### **Cognition**

- *cognition* is defined as the processes whereby we acquire and use knowledge
- *complexity* is defined as a set of related ideas that have a common emotional tone
- *metacognition* is the act of thinking about how we think, knowing how we arrived at decisions, and an understanding of the decision making process involved in solutions

### **Thinking**

- *convergent thinking*--whenever thinking is directed toward one correct solution to a problem, as is the case with deductive and inductive reasoning
- *divergent thinking*--thinking that meets the criteria of originality, inventiveness and flexibility
  - divergent thinking results in many possible correct solutions to a problem and is involved in creativity

### **Reasoning**

- there are three main types of reasoning we employ to solve problems:
  - *deductive reasoning*: goes from general to specific, like taking the clues to a murder mystery and figuring out who committed the crime
  - *inductive reasoning*: goes from specific to general, like taking the terms *image*, *prototype* and *phonemes*, and knowing that they all pertain to the concept *language*
  - *evaluative reasoning*: rely on value judgments or what is important to the individual, like which is the best car to buy for \$10,000

### **Information Processing**

- there are four main ways of processing information:
  - *controlled processing*: consciously processing information, like following the steps in baking a new dessert or concentrating on shifting, braking and accelerating when learning to drive a manual transmission
  - *automatic processing*: information processing that one is not consciously aware of, like hopping on a bike and riding away, not noticing your steering, balance and pedaling
  - *serial processing*: processing information in order; frequently the solution to one step provides information for the next, like in applying a math formula
  - *parallel processing*: processing many things at once, like you do when walking across campus and processing the location of fellow classmates, the terrain, your direction, etc.
- Karl Duncker proposed three stages involved in information processing:
  - *preparation stage*: assessing the task and what needs to be accomplished
  - *production stage*: producing possible solutions to the task in question
  - *judgment stage*: applying each solution to see if it solves the task

- other theorists have added the *incubation period* when individuals separate their problem-solving efforts and take a break
  - frequently, coming back to a problem-solving task after a break increases the likelihood of solving the problem

### **Problem Solving Strategies**

- *problem representation*: assessing and understanding what problem needs to be solved
- *algorithm*: step-by-step methods for problem solving that guarantee a solution, like a math formula
- *heuristic*: rules of thumb that assist in solving problems but do not guarantee a correct solution, like the phrase "i before e except after c"
  - *availability heuristic*--making decisions on the most readily available information (e.g. are there more words that begin with the letter K or have K as their third letter?)
  - *representativeness heuristic*--making decisions based on stereotypical or representative information
- *subgoals*: intermediate goals between the ultimate goal and beginning the problem solving process
- *means-ends analysis*: assessing where one is in the problem solving process and how much further they need to go to reach their goal
- *analogy*: the use of previous strategies in solving current problems
- *working backwards*: understanding the goal and then breaking down problem solving into the steps to get there
- *trial and error*: systematically trying possible solutions until the correct one is found; this works if there is a possible solution present

### **Problem Solving Obstacles**

- *functional fixedness*: seeing only one, fixed function for something; not thinking divergently
- *set*: using previous knowledge in problem solving that may interfere with solving the current problem
- *confirmation bias*: the tendency to look for evidence in support of a belief and to ignore evidence that would disprove a belief

### **Language**

- *language* is defined as a flexible system of communication that uses sounds, rules, gestures, or symbols to convey information
- there are three main theories on language development:
  - *learning theory*--advocated by Skinner, language is acquired through modeling, classical conditioning and/or operant conditioning
  - *cognitive development theory*--advocated by Piaget, language occurs toward the end of the sensorimotor period of cognitive development, and continues based on the individual's cognitive level and ability to process symbolic thought
  - *nativist theory*--advocated by Chomsky, believed there is an innate, inborn, biological device to acquire language

### Word and Sentence Structures

- *phonemes* are the basic building blocks of any language
  - they are the smallest units of sound, like *b*, *a*, and *t*
- putting these units of sound together into a meaningful units, like the word *bat* are called *morphemes*
  - morphemes can be complete words, but also root words and affixes
- *syntax* is the rules for arranging words into grammatical sentences
- *grammar* is defined as the language rules that determine how sounds and words can be combined and used to communicate meaning within a language
- *semantics* set the criteria for assigning meaning to morphemes
  - in determining meaning, the words *denotation* is the actual, literal definition (e.g. snake: any of numerous scaly, legless, sometimes venomous reptiles)
  - a word may have both positive and negative *connotations* (e.g. snake: danger or evil)
- the underlying meaning of a sentence is its *deep structure*

### Word and Sentence Structures

Arrange these words into a correct grammatical sentence:

1. hypothesis
2. the
3. language
4. We
5. relativity
6. thought.
7. the
8. somewhat
9. overstates
10. between
11. have
12. relationship
13. and
14. that
15. seen
16. linguistic

- *figurative language*:
  - *simile*: a comparison between two dissimilar objects using a word like *as* or *like* to connect them (e.g. he's like a typhoon in the house)
  - *metaphor*: similar to a simile, except that a metaphor compares two dissimilar objects without using a word like *as* or *like* (e.g. my boyfriend is an angel)
  - *personification*: presenting an inanimate object, animal, or abstraction with human qualities and characteristics (e.g. if you say that you have to talk sweetly to your computer because it is temperamental)
  - *hyperbole (overstatement)*: when you exaggerate a point that you are trying to make (e.g. you're so hungry you could eat a horse)

- *understatement*: implies more than is actually stated (e.g. you receive a grade of 100 when the class average is 71, one of your classmates asks you how you did on the test and you reply, "I did okay")
- *paradox*: A sentence that seems initially to have contradictory elements in it but after some reflection those elements later make sense (e.g. mornings are the darkest time for me)
- *pun*: a play on words that occurs when one word is used that reminds you of another word or words (e.g. if a dad says, "he is the son and all the world to me," there is a pun on the words *son* and *sun*)

Source: [http://www.eng.flu.edu.tw/English\\_Literature/terms/denotation.htm](http://www.eng.flu.edu.tw/English_Literature/terms/denotation.htm)

- semantics and deep structure in large part rely on *elaborative rehearsal*, connecting what we understand in language to what we already know in long term memory
- we can also figure out the meaning of words based on how that word is used in context--examine the following sentence:

The politician *assuaged* the fears of the crowd by assuring them there was nothing to worry about.

- based on the way the word *assuaged* is used in the sentence, you can guess it means to lessen or reduce
- a *cloze test* is used to determine how well a reader can use context clues in reading
  - it is composed of a reading passage with blank spaces every so often
  - the reader must figure out what part of speech and which exact word should go in the blank space

### **Transformational Grammar**

- Noam Chomsky is known for the concept of *transformation grammar*
- this is the idea that one can rearrange the surface structure of a sentence but preserve its deep structure
- the sentence "John and I went to the store" can be rearranged as "I went to the store with John"
  - both sentences impart the same meaning although they are different in structure

### **Images and Concepts**

- an *image* is a mental representation of a sensory experience
  - by picturing the Statue of Liberty or the Grand Canyon, you are creating an image in your mind
- *concepts* are mental categories for classifying objects, people or experiences
  - *cars*, *friends*, and *dates* are sample concepts

## Language Theorists

- Eleanor Rosch defined a *prototype* as a mental model that contains the most typical features of a concept
  - when you think of a *cat*, you know it will include four paws, a tail, pointy ears and whiskers; this makes up the prototypical cat
- George Lakoff extended Rosch's concept of a prototype and believed that most concepts fit together into an *idealized cognitive model (ICM)*
  - a week is typically composed of seven days (each divided into mornings, afternoons and evenings), five work days, and two weekend days
- Noam Chomsky is also known for the concept of the *Language Acquisition Device (LAD)*
  - this is an internal device, or mechanism, within each human that allows us to acquire language
- Benjamin Whorf is another important theorist who talked of the *linguistic relativity theory*
  - his theory is that our culture affects our language development
  - slang expressions unique to certain areas are examples of this
  - the language development in turn affects our mental processing and changes the way we perceive things

## Slang Expressions

- *Slang expressions* are commonly used in everyday language
  - they impart information that is culturally-based
  - they possess different connotations
  - they spice up our day-to-day discussions
  - they can relay inside information between those who are conversing